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**Systems Requirements Specification Project**

*by* WE5

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*Authors:*

**Lincoln Taniguchi (4801601)**

**Avi Modi (7006683)**

**Nhat Nguyen(6633617)**

**Rachit Naidu(7014856)**

**Rashi Kapoor(6926533)**

*Supervisor:*

**Dr.Sutharsan Sivagnanam**

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# Chapter 1

## Vision Document

### 1.1 Introduction

#### 1.1.1 Purpose

The purpose of this Vision document is to gather, analyze, and define high-level requirements (needs) and features of the Clinical Decision Support System (CDSS). Its primary focus is to provide the capabilities needed by the Hospital staff, Doctors, and why these needs exist. The details of how the CDSS fulfils these needs are explained with the help of different UML (use-case, domain model, system state diagram, etc) diagrams and supplementary document.

#### 1.1.2 Scope

This Vision Document applies to the Clinical Decision Support System (CDSS), which will be developed by the WE5 Development team. The WE5 team will develop this decision support system to interface with existing systems used by the hospital. The (CDSS) provides access to patients history, recording patients information, Wound Catalogue, Warning and Alarms features to notify nurses for their duties, graph about patients recovery. The system supports access to the system through local computers and smart phones or mobile devices (e.g., smartphone, tablet).

## 1.2 Positioning

### 1.2.1 Problem Statement

The problem of	<ul style="list-style-type: none"><li>• Lack of an expert knowledge system which nurses get required information of a wound and recommended course of treatment</li><li>• Inaccurate and inefficient in maintaining patients record</li><li>• Lack of warning on patients allergies or on due assigned tasks or conflict between advices</li><li>• Time consuming to generate patient brochure</li></ul>
Affects	Patients, doctors, nurses and the hospitals reputation
The impact of which is	Uncertainty and cost-inefficient in course of treatment, as well as, patient dissatisfaction can damage relation between hospitals staffs and even on worse cases, they can destroy hospital reputation
A successful solution would be	<p>Clinical support System</p> <ul style="list-style-type: none"><li>• Nurse can refer expert information easily and quickly</li><li>• Accurate and efficient in storing and accessing patient records</li><li>• Staffs will be reminded on overdue assigned tasks or patients allergies</li><li>• Can generate patient brochure quickly</li></ul>

### 1.2.2 Product Position Statement

For	Hospital nurses
Who	Feels the need of a system which helps them in taking good care patients by providing expert information along with warning and alerts based on the patient and tasks
The Clinical Decision Support System	Is a software product that integrates the expert knowledge of supervisors and doctors experiences in an accessible and systematic approach
That	Can maintain patients record, find/browse expert information about wound and recommended on course of treatment, alerts and warnings about the patients allergies
Unlike	Current system where the records are maintained manually and if a nurse has a trouble she has to ask the supervisor nurse or a doctor every time
Our product	Makes the process easier by providing easy-to-use interface for entering patients/wound records, providing expert information about wounds and generating alerts and warnings based on the patients information through the use of artificial intelligence

## 1.3 Stakeholder description

### 1.3.1 Stakeholder Summary

Name	Description	Responsibilities
Nurse	The primary end user of the system	<ul style="list-style-type: none"><li>• Nurses need an application where they can add, delete, modify and save patients information quickly</li><li>• Nurses need an application where they can quickly add or modify wound record manually or automatically by reading data from other medical devices</li><li>• Furthermore, they need a system which can be a reminder for a particular approach of treatment.</li></ul>
Supervisor	Works with the Nurses during treatment of a patient	<ul style="list-style-type: none"><li>• They need a sophisticated system to approve all the changes made by nurses</li><li>• This stakeholder needs an interface to access the patients historical records and assess patients progress</li></ul>
Administrator	Works with doctors to manage the knowledge base systems	<ul style="list-style-type: none"><li>• They need a system to update the information and ensure the maintainability of the system.</li><li>• Provide access to all stakeholders as per their privileges.</li></ul>

Doctor	Another primary enduser of the system	<ul style="list-style-type: none"> <li>They need a system to ensure that all the information updated is accurate as per the medical domain</li> <li>They need to review the changes approved by the supervisor</li> <li>They need a system to check the patients history and the treatment given to patients by nurses</li> </ul>
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### 1.3.2 Stakeholder environment

User can access CDSS via computer, smart phones or tablet device like iPad. The software can be deployed in any platform. To print reports and patients brochure the system on the mobile devices (smart phone or table) must be connected to Air Printers through Wireless Network

## 1.4 Product Overview

The main objective of this project is to provide a system that can be efficiently used by the stakeholders (Nurses, doctors and supervisors) to access all the information about the patients wound and side effects related to any medication as well as the patients history

### 1.4.1 Product Perspective

The system would need Windows Server to run server component and database system and Windows or Mobile Platform to run client component

#### **1.4.2 Product Position Statement**

For	The doctors , nurses and supervisors
Who	Would access the System
The System	to gather information on patients wound ,history and allergies
That	Would save time
Unlike	Other time consuming procedures
Our Product	Will be efficient and would help in the early recovery of the patients

#### **1.4.3 Summary of Capabilities**

Stakeholders Benefits	Supporting Benefits
The system would be user friendly	User Guides and Tutorials are available
The learning curve is minimal	User Interface is user friendly
System is responsive and accurate	Fast retrieval of required results
It is usable by all stakeholders with any background	Required training to use the system is very little

#### **1.4.4 Assumptions and Dependencies**

System would require an operating system preferably Windows OS

#### **1.4.5 Cost and Pricing**

This project is not aimed to be deployed to any markets; therefore, no study on costs or prices is referred to it

### **1.5 Feature Attributes**

1. The system provides an easy access to expert information
2. Patients historical medicine records

3. Warning on due assigned tasks or patient treatment

## 1.6 Needs

1. Nurses should be able to enter patient wound record both Mobile Platform and Computer
2. Nurses should be able to determine the wound stage automatically according to the current data of patient
3. Nurses should be able to print or generate patients discharged brochure quickly without entering so much data
4. The system should be able to raise conflicts between doctors and supervisors if they have different advices
5. Doctors or supervisor should be able to see the progress charts of patient easily
6. Nurses should be able to access the expert information (such as wound category, prescription, ...) that saved in the system
7. Nurse or Doctors or Supervisors should be able to retrieve the historical patient's records
8. Nurses should be able to set up schedule to check wound or change dressing and be reminded on the right time
9. The system should be able to recommend the appropriate treatment plan or medicine for patients
10. Nurses should be able to verify whether patient can use specific medicine or not based on doctor recommendation and patients preferences (allergy or health status or in pregnant)
11. Authentication

## 1.7 Product Features

1. The nurse should be able to enter wound record such as length, color, depth, blood into the system and these information will be stored. This action should be done on either Computer or Mobile platform

2. The nurses should be able store biographic information of patients such as allergies, pregnant status, health status
3. The nurse (doctor or supervisor) should be able to retrieve the patient's wound stage according to the patient's current information
4. The system should be able to learn or upgrade its expert knowledge automatically or manually
5. Nurses should be able to print or generate discharged brochure quickly without entering so much data
6. The nurse should be able to submit request advice or special treatment for specific patient to either doctor or her supervisor. This request should be recorded and forwarded to appropriate people
7. The doctor or supervisor should be notified when nurses have submitted requests to them. They should be able to respond their advices via the system. These advices should be tracked and forwarded to appropriate nurse
8. The system should be able to raise alert if there is any conflict on advices to all related people
9. Doctor or supervisor should be able to assess the patient progress easily though chart that reflects the progress of patient wound.
10. Nurses, Doctors or Supervisors should be able to access the expert information such as wound category, prescription
11. Nurses, Doctors or Supervisors should be able to search the expert information by keyword or its content
12. The administrator should be able to enter or update the expert information
13. New expert information should be approved before being available publicly for using
14. Nurse or doctors or supervisors should be able to retrieve the historical patient's records
15. Doctors or supervisors should be able to generate and print patients reports

16. Nurses should be able to add/remove/edit the schedule (tasks)
17. The system should raise alert if there is any overlapped schedules
18. The system should notify nurses on the due time of events
19. The system should be able to recommend appropriate treatment and medicine for specific patient
20. Nurses should be able to verify whether patient can use specific drug
21. Users can enter or access information only under their privileges
22. Users can login/logout by their username and password
23. Depend on user role, different user will have different permission to access specific data
24. The system should be able to export data in EHR format that can be transferred and be understood by other organizations
25. The administrator should be able to create/delete/modify user accounts and their roles
26. The administrator should be able to backup/restore data for the system
27. If patient is allergic to certain medicine or ointment the system should warn the nurse about it
28. If there is overdue about dressing or reposition of patients, the system should raise alarm to the nurse who is in charge, or her supervisors, and doctors

## **1.8 Documentation Requirements**

### **1.8.1 Applicable Standards**

The nursing decision support system should follow the quality standards (International Standard organization ISO9000) to ensure the accuracy of the results as outcomes of the system

### **1.8.2 System Requirements**

The system would require huge amount of memory spaces (in terabytes) to store the patient records and the treatment plans

### **1.8.3 Performance Requirement**

The system should perform such that it handles real time situations and could be used when ever needed by the stakeholders. In other words it should work nonstop without any fatigue.

## **1.9 User Documentation**

### **1.9.1 User Manual**

- The user manual should describe the basic functioning of the system
- It should also describe how to access the database for medical records
- It should also describe the process of authentication needed to get the access
- It shall list and describe system features

### **1.9.2 Installation Guide, Configuration and Read me Files**

- Installation guide shall show how to install the system with pictures step by step.
- Read me file shall list new features. It also shall list common troubleshooting and workaround.



# Chapter 2

## Use Cases & Requirement Priority

### 2.1 Context Diagram Use Case

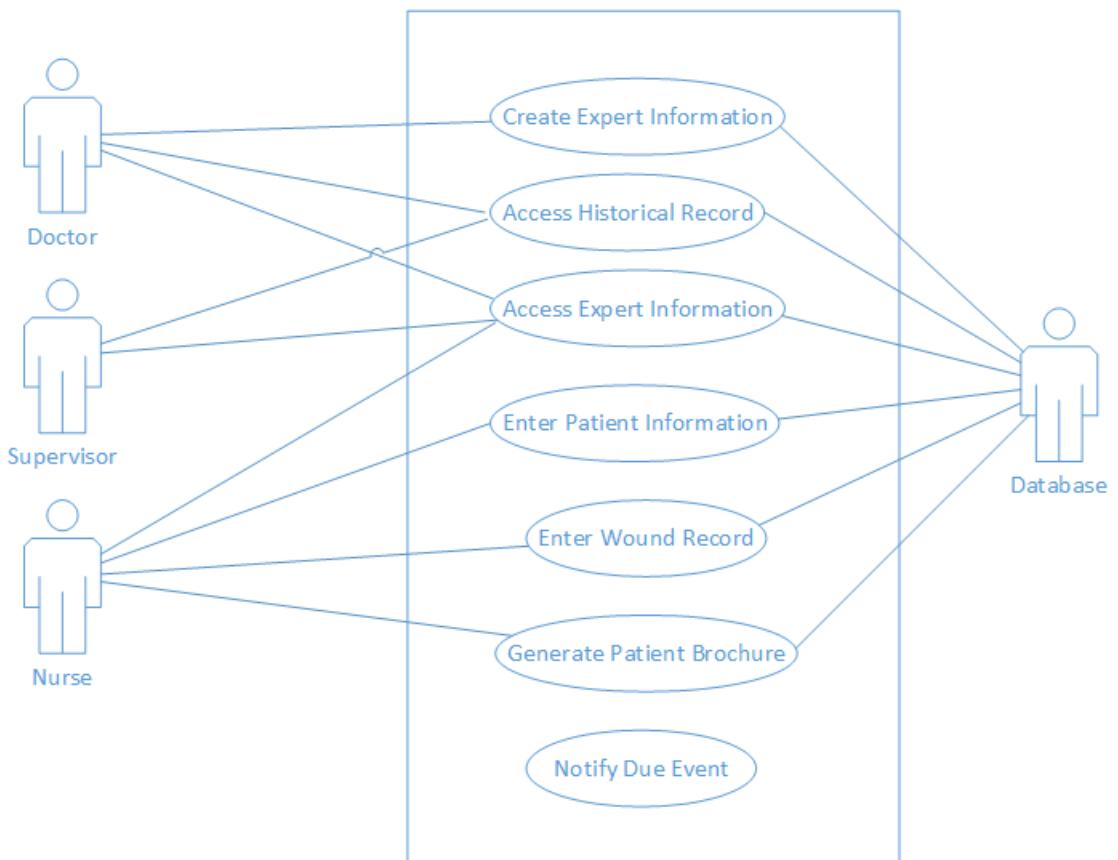


Figure 2.1: Context Diagram Use Case

## 2.2 Brief Use Cases

### 2.2.1 Store Wound Record

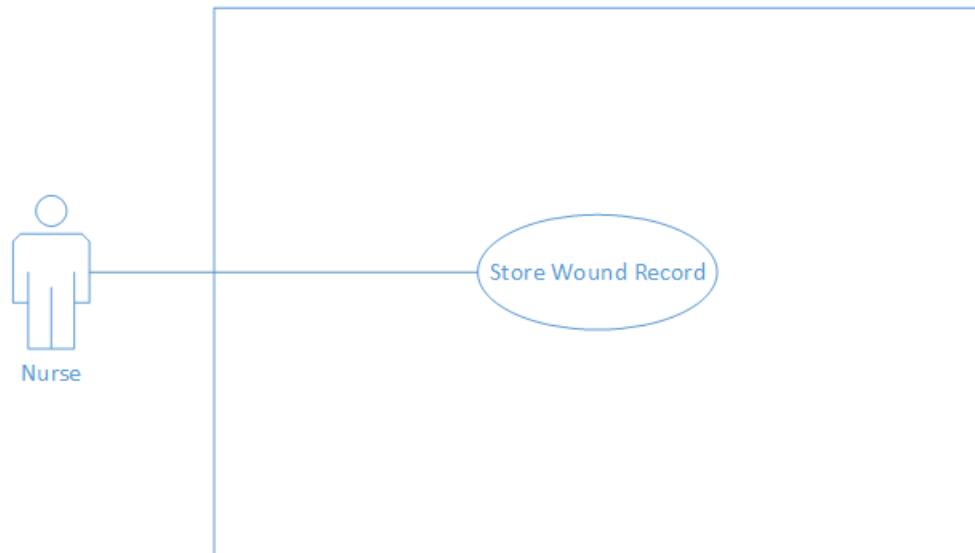


Figure 2.2: Store Wound Record Use Case

Nurse should be able to store wound record into the system. The record involves the size color and depth of the wound, blood status... Before records are saved in the database, the record values should be validated to make sure its values are in correct format and valid range. The input can be retrieved from other medicine devices that are being used for patient

## 2.2.2 Enter Patient Information

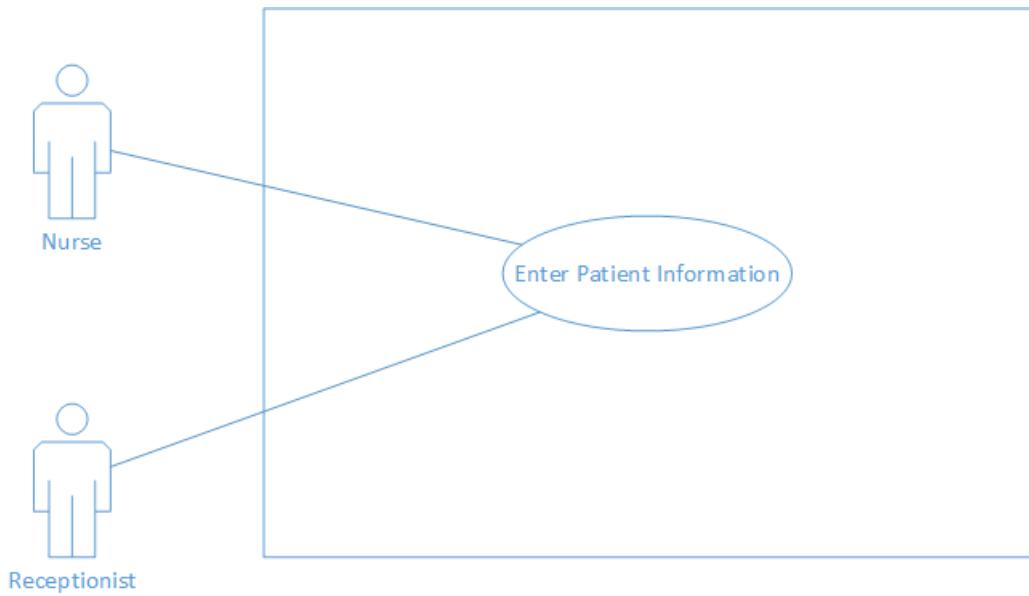


Figure 2.3: Enter Patient Information Brief Use Case

The users (i.e. Nurses, Receptionist) enter the patient information regarding his/her personal information such as name, address and contact details and medical biography such as the allergies either manually or automatically from data that received other hospitals. The system is able to detect if the patient is already existed in the system

### 2.2.3 Generate Patient Brochure

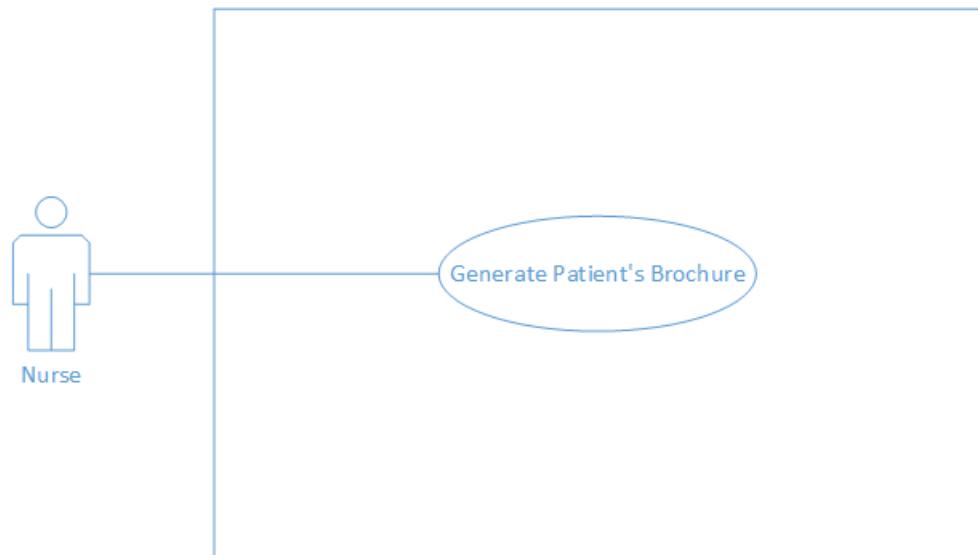


Figure 2.4: Generate Patient Brochure Brief Use Case

Users especially Nurses, can generate patients brochure without entering too much information. The users are also able to print and export the generated brochure to standard image format

## 2.2.4 Requests Advisor's Support

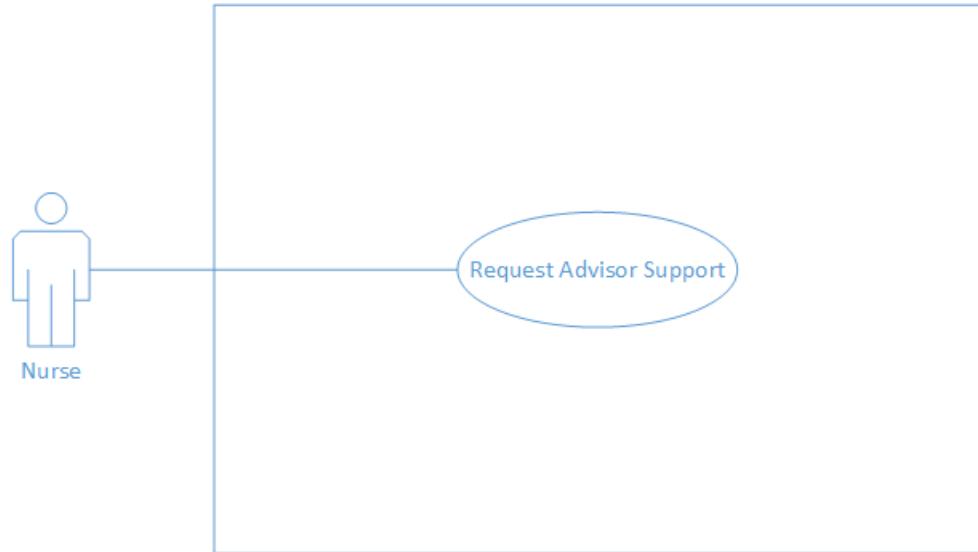


Figure 2.5: Requests Advisor's Support Brief Use Case

The nurse can make a request support to his/her supervisor or doctor. When the request is committed, the system will forward and notify the receiver. All participants will be able to follow the progress of the request

### 2.2.5 Notify Due Scheduled Events

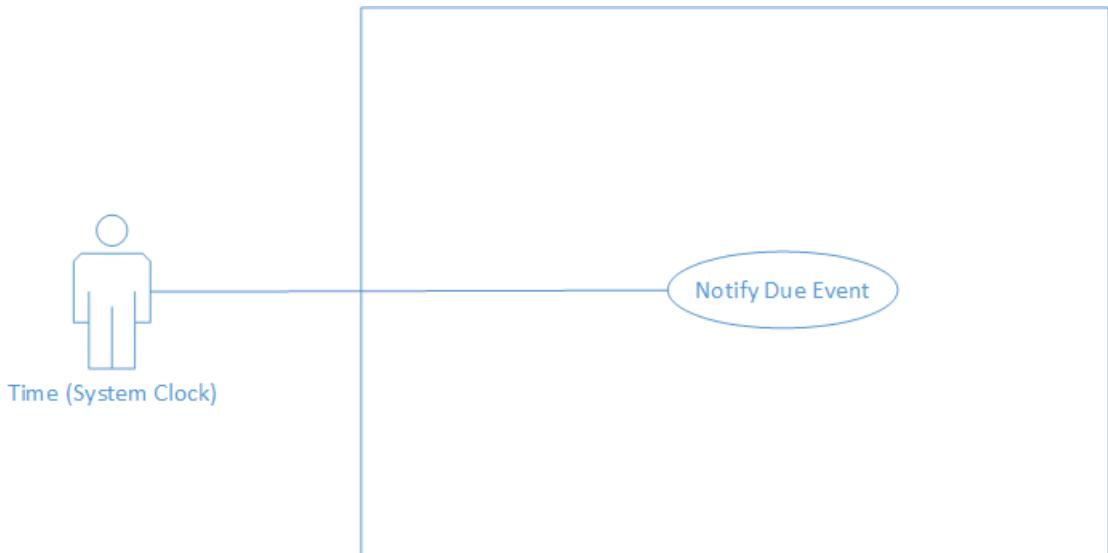


Figure 2.6: Notify Due Scheduled Events Brief Use Case

The nurses (can be doctors or supervisors) want to be reminded or warned when their scheduled events or tasks (which entered into the system automatically or manually) are going to start or due or overdue

## 2.2.6 Access Historical Records

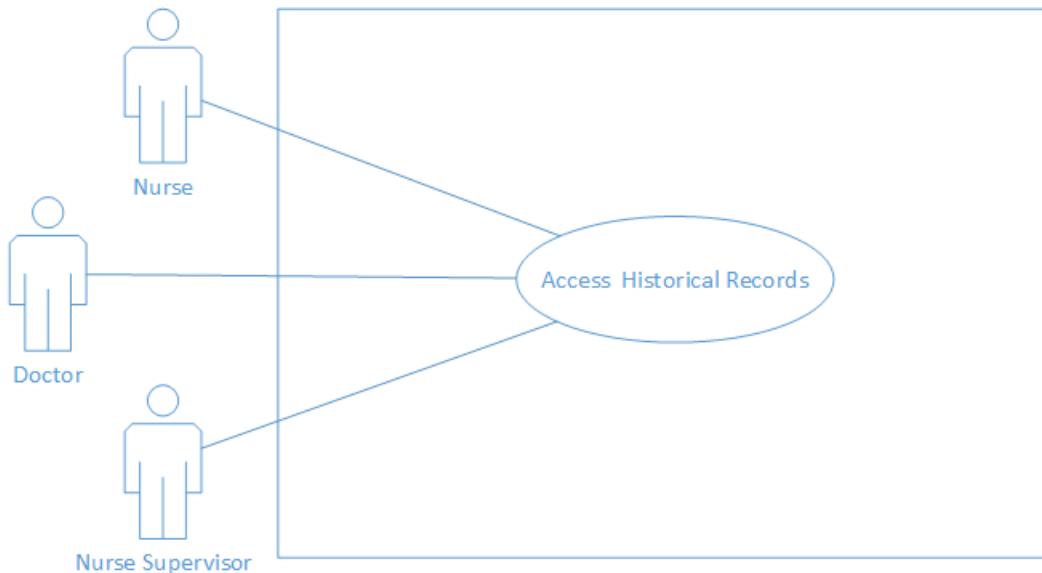


Figure 2.7: Access Historical Records Brief Use Case

Nurse, supervisor or doctor accesses historical records of patients which either entered by the hospital or received from other hospitals to assess the patients progress. They can see historical records in single mode, aggregated mode and progress chart with filtering predicate (condition) . Users can export or print the historical records

## 2.3 Cost Value Prioritization for use cases

Requirements Prioritization Using Analytic Hierarchy Process (AHP) Method

### Relative Values

1 Contributes equally	3 Contributes slightly more
5 Contributes strongly more	7 Contributes very strongly more
9 Contributes extremely more.	

	EPI	SWR	AEI	AHR	NDE	RAS	NAC	GPB
Enter Patient Information	1	1/3	1/5	1/3	1/5	1/3	1/9	1/5
Store wound Information	3	1	1/3	1	1/3	1	1/7	1/3
Access Expert Information	5	3	1	3	1	3	1/5	1
Access Historical Records	3	1	1/3	1	1/3	1	1/7	1/3
Notify Due Events	5	3	1	3	1	3	1/5	3
Request Advisor's Support	3	1	1/3	1	1/3	1	1/9	1/3
Notify Advice Conflicts	9	7	5	7	5	9	1	5
Generate Patient's Brochure	5	3	1	3	1/3	3	1/5	1

Table 2.1: AHP Comparison matrix with relative values of requirement

	SPI	SWR	AEI	AHR	NDE	RAS	NAC	GPB	Rel
Enter Patient Information	0.07	0.06	0.10	0.11	0.02	0.16	0.17	0.13	0.10
Store wound Information	0.37	0.32	0.30	0.33	0.33	0.22	0.21	0.31	0.30
Access Expert Information	0.22	0.32	0.30	0.33	0.33	0.22	0.17	0.22	0.26
Access Historical Records	0.07	0.11	0.10	0.11	0.20	0.16	0.12	0.13	0.12
Notify Due Events	0.22	0.06	0.06	0.04	0.07	0.10	0.12	0.13	0.10
Request Advisor's Support	0.01	0.05	0.04	0.02	0.02	0.03	0.07	0.01	0.03
Notify Advice Conflicts	0.01	0.04	0.04	0.02	0.01	0.01	0.02	0.01	0.02
Generate Patient's Brochure	0.02	0.05	0.06	0.04	0.02	0.10	0.12	0.04	0.06

Table 2.2: Normalized matrix and relative contributions of requirement to the project's overall value

	EPI	SWR	AEI	AHR	NDE	RAS	NAC	GPB
Enter Patient Information	1	1/3	1/5	1/3	1/5	1/3	1/9	1/5
Store wound Information	3	1	1/3	1	1/3	1	1/7	1/3
Access Expert Information	5	3	1	3	1	3	1/5	1
Access Historical Records	3	1	1/3	1	1/3	1	1/7	1/3
Notify Due Events	5	3	1	3	1	3	1/5	3
Request Advisor's Support	3	1	1/3	1	1/3	1	1/9	1/3
Notify Advice Conflicts	9	7	5	7	5	9	1	5
Generate Patient's Brochure	5	3	1	3	1/3	3	1/5	1

Table 2.3: AHP comparison matrix with relative costs of requirement

	EPI	SWR	AEI	AHR	ASE	RAS	NAC	GPB	REL
Enter Patient Information	0.03	0.02	0.02	0.02	0.02	0.02	0.05	0.02	0.02
Store wound Information	0.09	0.05	0.04	0.05	0.04	0.05	0.07	0.03	0.05
Access Expert Information	0.15	0.16	0.11	0.16	0.12	0.14	0.09	0.09	0.13
Access Historical Records	0.09	0.05	0.04	0.05	0.04	0.05	0.07	0.03	0.05
Notify Due Events	0.15	0.16	0.11	0.16	0.12	0.14	0.09	0.27	0.15
Request Advisor's Support	0.09	0.05	0.04	0.05	0.04	0.05	0.05	0.03	0.05
Notify Advice Conflicts	0.26	0.36	0.54	0.36	0.59	0.42	0.47	0.45	0.43
Generate Patients Brochure	0.15	0.16	0.11	0.16	0.04	0.14	0.09	0.09	0.12

Table 2.4: Normalized matrix and relative contribution of requirement to the project's overall cost

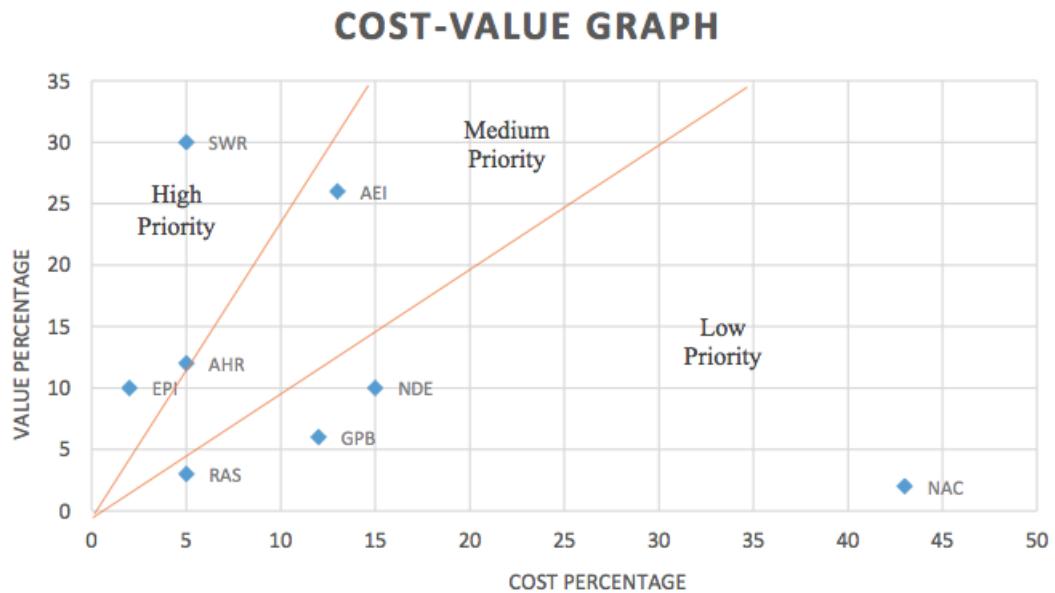


Figure 2.8: Value-Cost Requirement prioritization obtained by AHP

**EPI:** Enter Patient Information

**AEI:** Access Expert Information

**ASE:** Alarm Scheduled Events

**SWR:** Store wound Record

**AHR:** Access Historical Records

**RAS:** Request Advisors Support

*Please note that we picked use cases to make fully dressed not based on the result of AHP but for the sake of diversity of diagram. We would like to cover special circumstances of use cases such as extend, include and whitebox (The actor comes from internal instead of external)*

# Chapter 3

## Detailed Use Cases

This chapter describe the selected usecases in fully detailed which includes fully dressed, system sequence diagram, activity diagram and testcases

### 3.1 Store Wound Record

#### 3.1.1 Fully Dressed Usecase

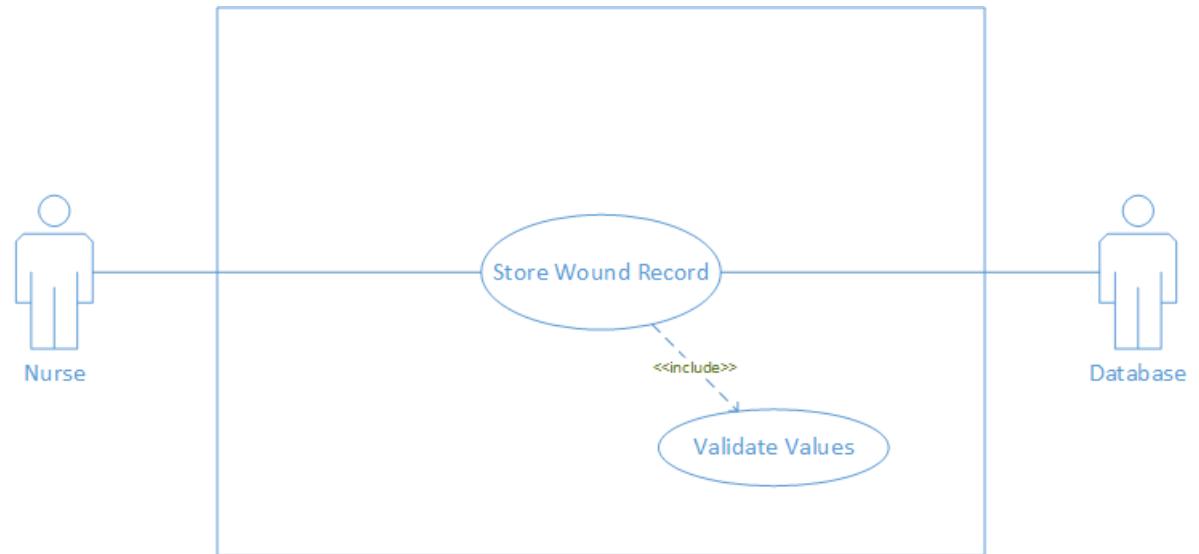


Figure 3.1: Store Wound Record Fully Dressed

Use case ID	UC_Store_Wound_Record
Use case name	Store Wound Record
Scope	System Under Discussion
Level	User level (Stakeholders)
Primary Actor	Nurse
Stakeholders And interests	Nurse want to enter wound record easily and quickly
Preconditions	Intranet should be available at all times
Post Conditions	The saved wound records should be accessible at all times
Main Success Scenarios	<ol style="list-style-type: none"> <li>1. Nurse indicates the system that s/he is going to enter the wound record.</li> <li>2. Nurse selects the existing patient.</li> <li>3. Nurse selects the wound type.</li> <li>4. Nurse enters all the required fields such as size color or depth of the wound.</li> <li>5. Nurse tells the system to save the record</li> <li>6. After the record is saved ,the system should indicate operation status and redirect to the previous screen</li> </ol>

Extensions	<p>1a. Nurse is not logged in</p> <ol style="list-style-type: none"> <li>1. System redirect to login screen</li> <li>2. After logging in successfully, the system should redirect to storing wound record screen</li> </ol> <p>2a. Patient is not existed</p> <ol style="list-style-type: none"> <li>1. System redirect to create new patient screen</li> <li>2. After creating in successfully, the system should redirect to storing wound record screen</li> </ol> <p>4a. Nurse can enter data by synchronizing with medical devices instead of using keyboard or touchscreen</p> <p>5a. If the entered values are incorrect the system can alert so that he /she can modify the information</p>
Special Requirements	Should be able to edit the information as per the changes in future
Technology and data variations list	The platform used for this system is Windows OS, iOS and database software
Frequency of occurrence	Once day for each patient. Some kind of wound requires logging record twice a day
Miscellaneous	The system should be able to fill out some default values

Table 3.1: UC\_Store\_Wound\_Record

### 3.1.2 System Sequence Diagram

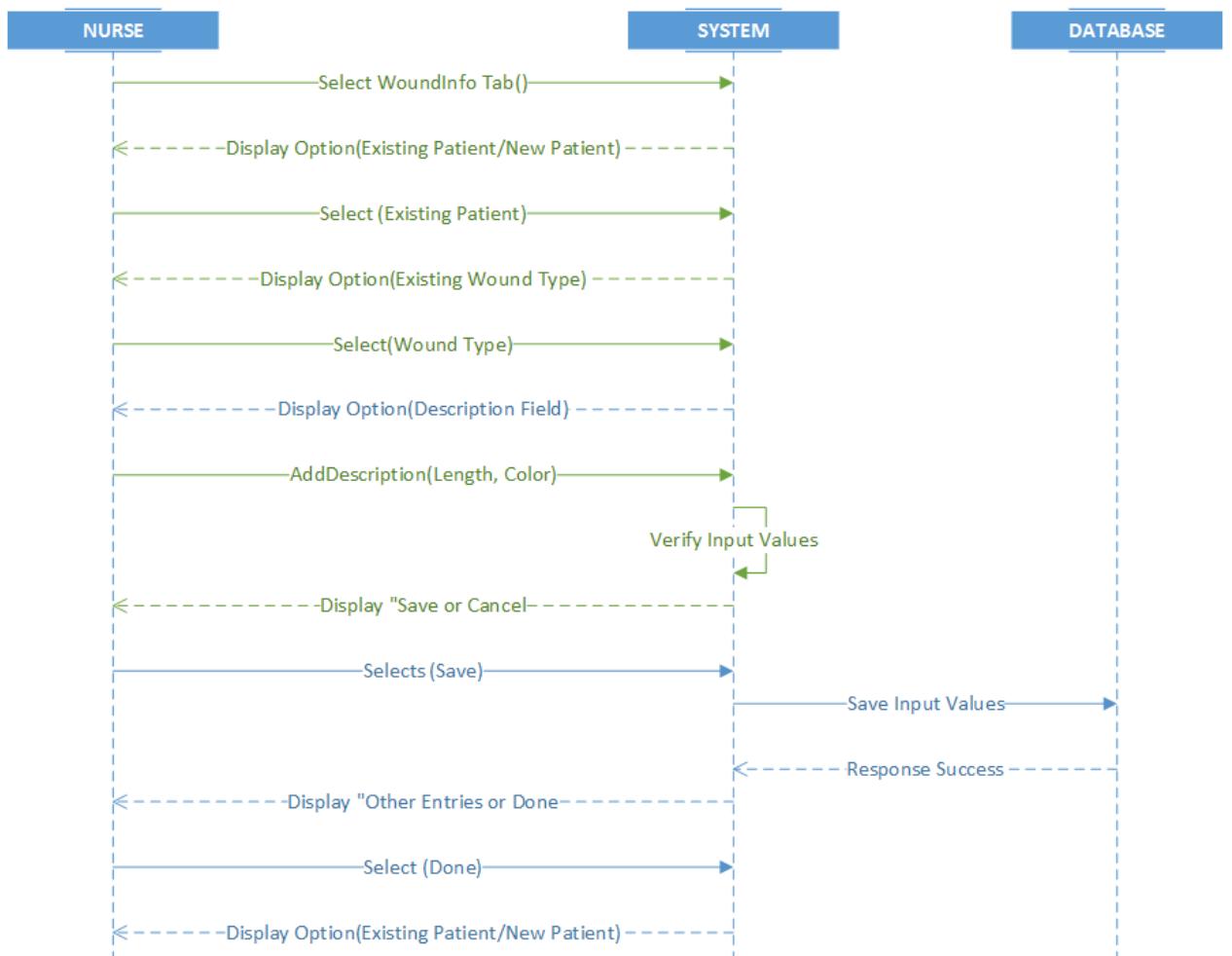


Figure 3.2: Store Wound Record System Sequence Diagram

### 3.1.3 Activity Diagram

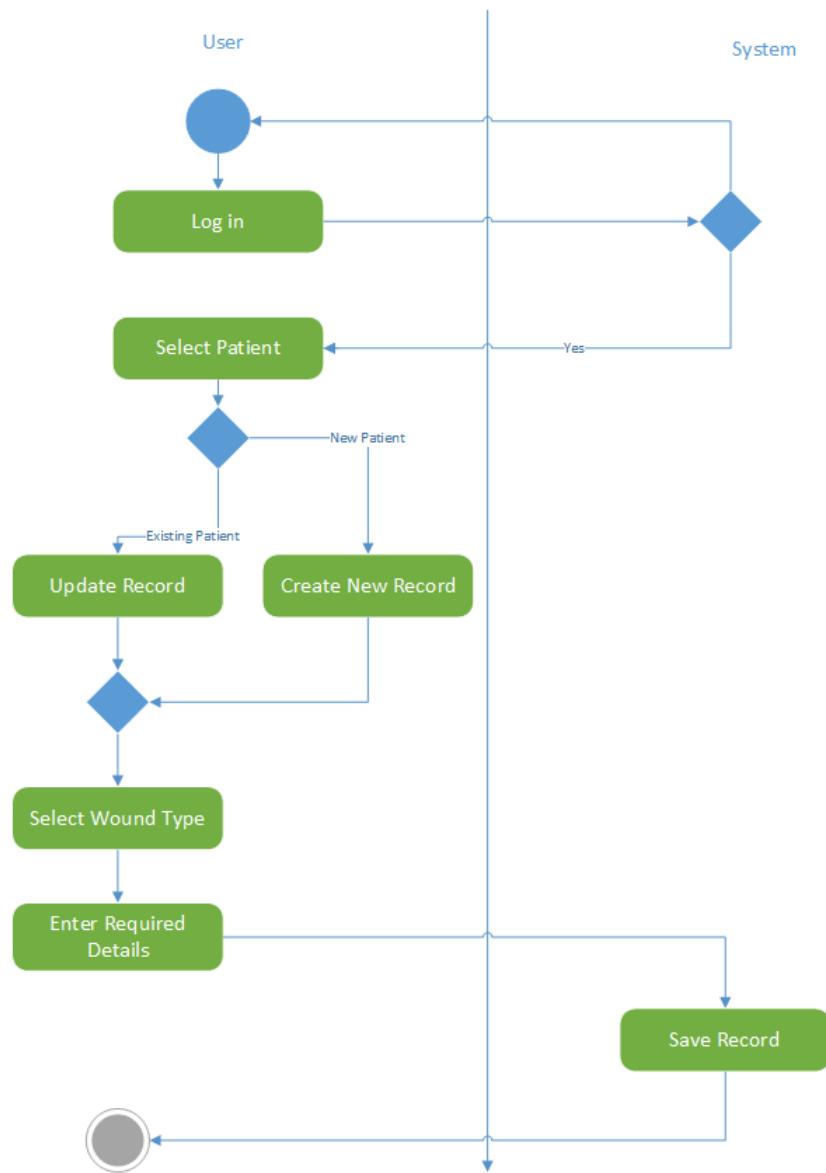


Figure 3.3: Store Wound Record Activity Diagram

### 3.1.4 Testcases

#### Main Scenario Test Case

Test Case ID	TC_Store_Wound_Record_1
Title	Manually Entering Valid Wound Information
Requirement	Testcase for main scenario of Store Wound Record
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"> <li>• User successfully login to the system as Nurse</li> <li>• Patient information exists in the system</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Select "New Wound Record" from main menu</li> <li>2. Select the patient from the list</li> <li>3. Select the wound type</li> <li>4. Enter all required wound information fields with valid values</li> <li>5. Click on save button.</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• The new record should be added to the system with correct values</li> <li>• The new record should be added to the selected patient</li> <li>• The system should log the nurse activity (entering new wound record)</li> </ul>

Table 3.2: TC\_Store\_Wound\_Record\_1

## Extension 4a Test Case

Test Case ID	TC_Store Wound Record_2
Title	Reading data from medical devices
Requirement	Testcase for Extension 2a of Store Wound Record
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"> <li>• Medical Device is allowed to connect/update the system</li> <li>• Patient information exists in the system</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Select "New Wound Record" from main menu</li> <li>2. Select the patient from the list</li> <li>3. Select to synchronize with medical devices</li> <li>4. Wait until the synchronization gets done</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• The new record should be added to the system with the values from medical device</li> <li>• The new record should be marked as Automatically</li> <li>• The new record should be added to the selected patient</li> <li>• The system should log the nurse activity</li> </ul>

Table 3.3: TC\_Store Wound Record\_2

## 3.2 Access Expert Information

### 3.2.1 Fully Dressed Usecase

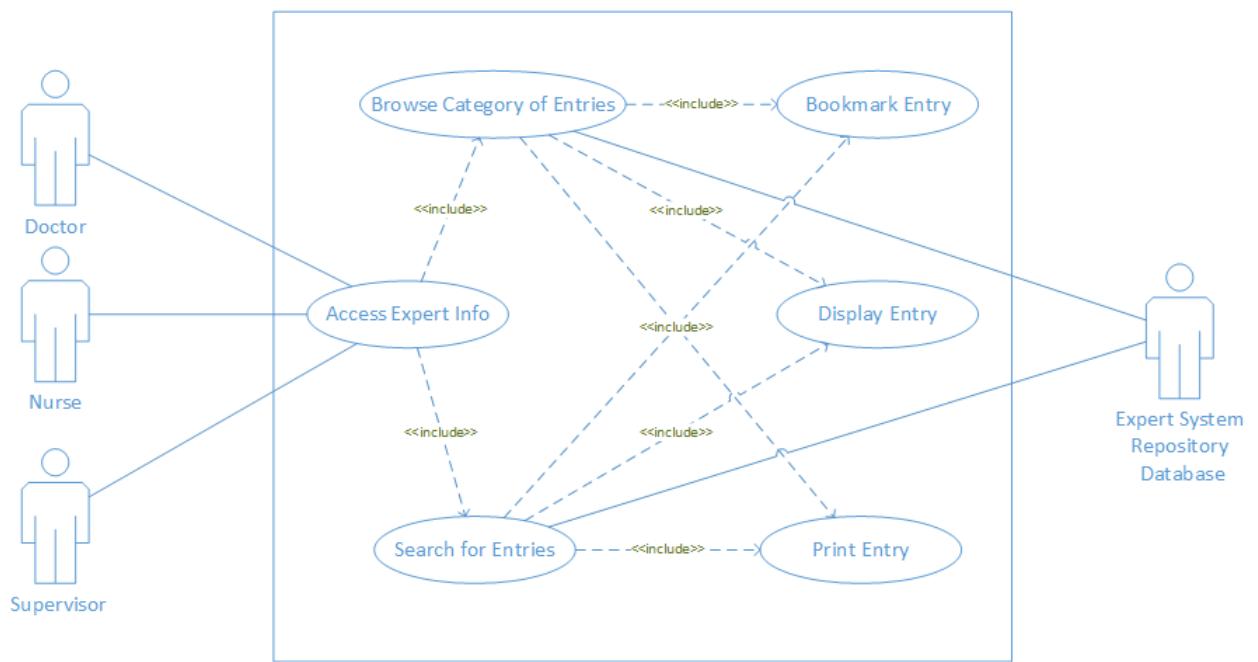


Figure 3.4: Access Expert Information Fully Dressed

Use case ID	UC_Access_Expert_Information
Use case name	Access Expert Information
Scope	System under Discussion
Level	User Level
Primary Actor	Nurse, Doctor and Supervisor
Stakeholders And interests	Browse and query the expert information about the wound
Preconditions	<ul style="list-style-type: none"><li>• The user should have a valid access to the system</li><li>• All the hardware (e.g. printer, keyboard, mouse) are working properly</li></ul>

Post Conditions	<ul style="list-style-type: none"> <li>● The user should be able to get the desired information from the system</li> <li>● The user should be able to search the information through the search box</li> <li>● The system should provide accurate results</li> </ul>
Main Success Scenarios	<ol style="list-style-type: none"> <li>1. User indicates the system that s/he want to access to the Expert Information</li> <li>2. User enter keyword to search for specific entries</li> <li>3. System processes the request by querying entries from database</li> <li>4. System displays the queried result</li> <li>5. User selects specific entry to display, bookmark or print</li> </ol>
Extensions	<p>2a User wants to browse category of expert information</p> <ol style="list-style-type: none"> <li>1. System fetches category from database</li> <li>2. System displays appropriate category based on user selection</li> <li>3. Once user goes to entry level, s/he can select entry to display, bookmark or print</li> </ol> <p>4b No entry found for the keyword</p> <ol style="list-style-type: none"> <li>1. System displays error message</li> <li>2. System suggests a close keyword that may have entries</li> </ol>

Special Requirements	Should show suggestion when user is typing keyword to search
Technology and data variations list	Every time when user wants to retrieve any expert information such wound category
Frequency of occurrence	Every time when user wants to retrieve any expert information such wound category
Miscellaneous	Automatic spelling feature to correct common typo mistakes when the user (e.g. nurse) entries a query.

Table 3.4: UC\_Access\_Expert\_Information

### 3.2.2 System Sequence Diagram

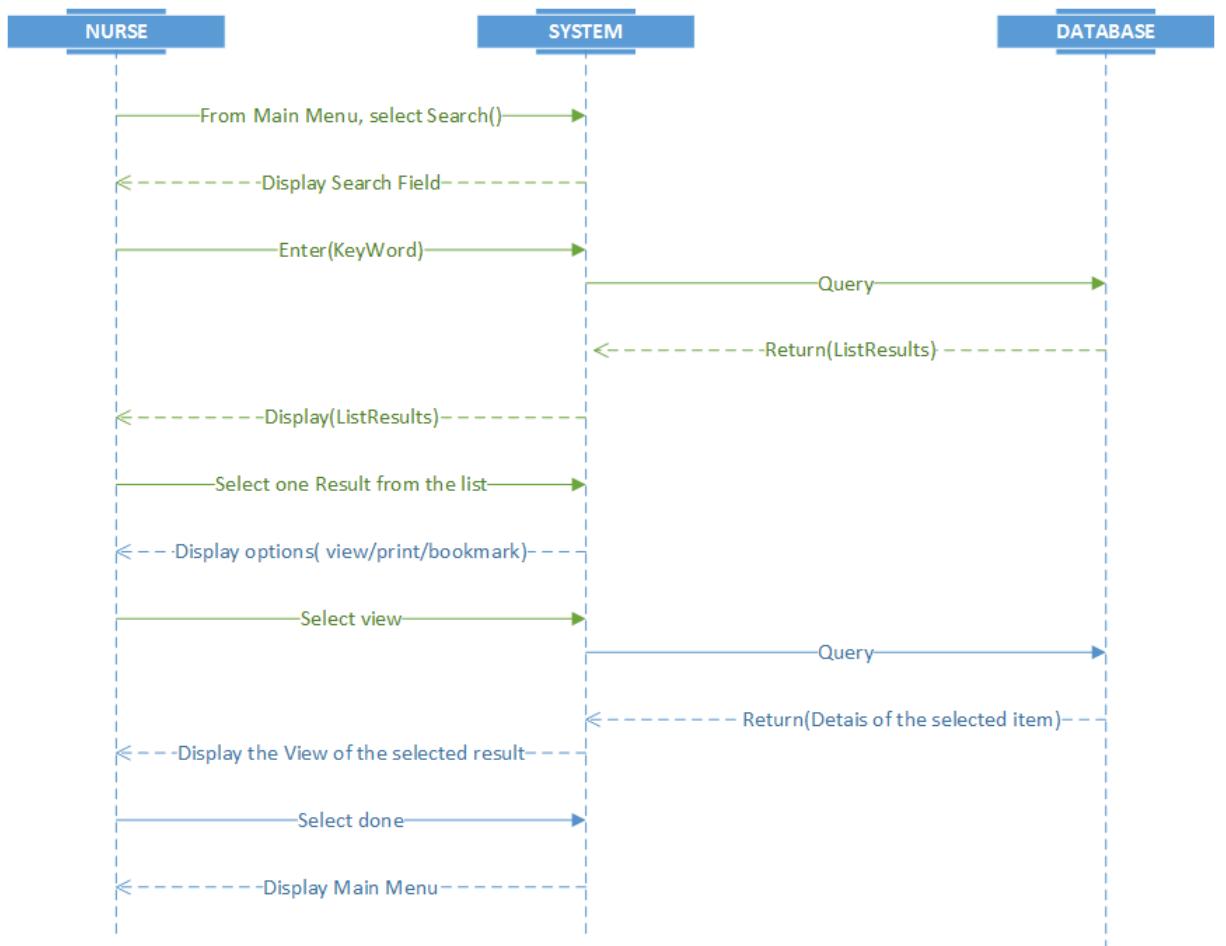


Figure 3.5: Access Expert Information System Sequence Diagram

### 3.2.3 Activity Diagram

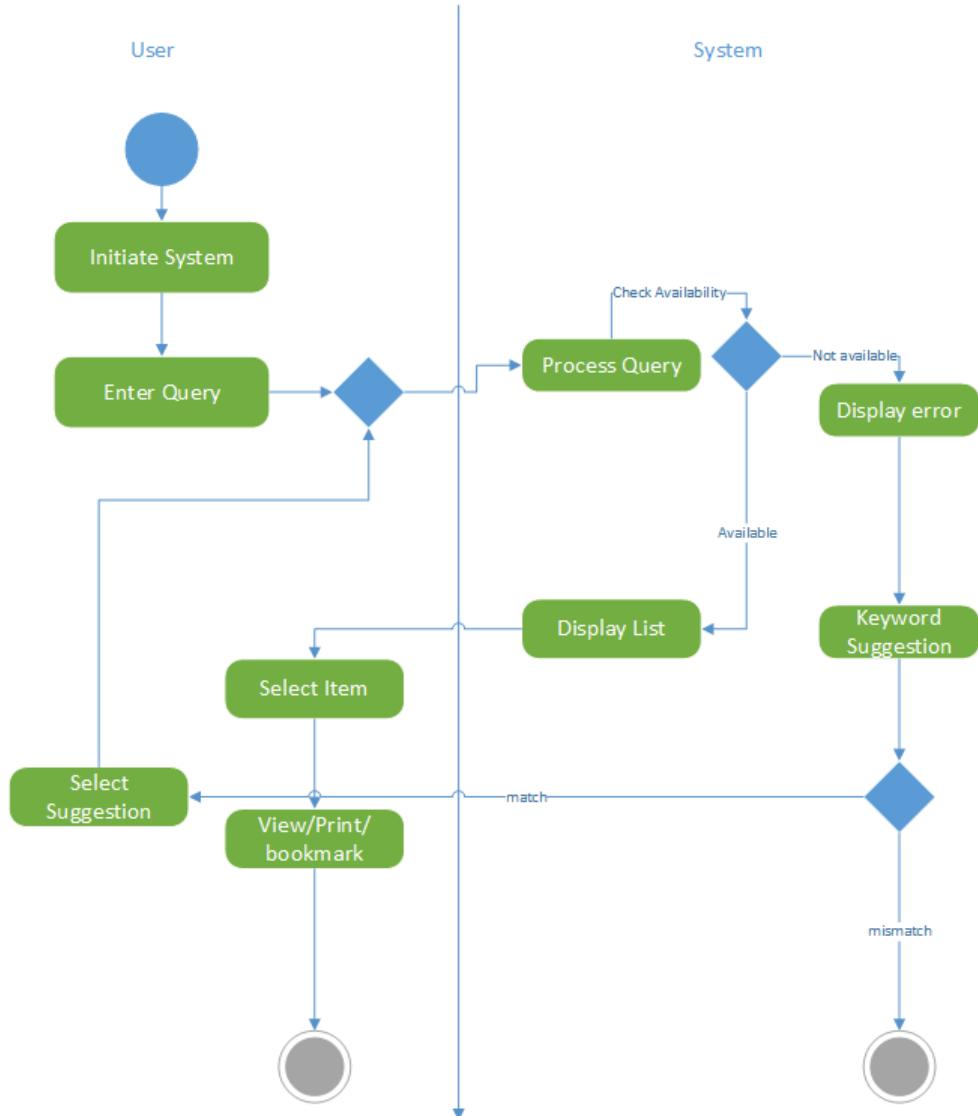


Figure 3.6: Access Expert Information Activity Diagram

### 3.2.4 Testcases

#### Main Scenario Test Case

Test Case ID	TC_Access_Expert_Information_1
Title	Searching the Expert Information
Requirement	Testcase for main scenario of Access Expert Information
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"> <li>• The user should have be logged in to the system as nurse</li> <li>• Keyboard and mouse are working properly and connect to the system</li> <li>• The article which user wants to search is available in the system</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Select the search information option (from the main menu)</li> <li>2. Type the query in the search box</li> <li>3. Click on the search button</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• Each article of the returned list must contain the keyword that user has queried (Correctness)</li> <li>• The number of articles of the returned list must be complete. No article is missing (Completeness)</li> </ul>

Table 3.5: TC\_Access\_Expert\_Information\_1

## Extension 2a Test Case

Test Case ID	TC_Access Expert Information_2
Title	Browsing the Expert Information Entry
Requirement	Testcase for Extension 2a of Access Expert Information
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"> <li>• The user should have be logged in to the system as nurse</li> <li>• Keyboard and mouse are working properly and connect to the system</li> <li>• The article which user wants to access is already available in the Expert System</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Select Browse option</li> <li>2. Select Browse category</li> <li>3. Select the article from the available list</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• The number of categories must be displayed in Alphabet order and complete</li> <li>• The entry must be displayed under the correct category</li> <li>• The entry must be displayed in Alphabet in each category</li> </ul>

Table 3.6: TC\_Access Expert Information\_2

## Extension 4b Test Case

Test Case ID	TC_Access Expert Information_3
Title	Search for unavailable Expert Information Entry
Requirement	Testcase for Extension 4b of Access Expert Information
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"> <li>• The user should have be logged in to the system as nurse</li> <li>• Keyboard and mouse are working properly and connect to the system</li> <li>• The article which user wants to search is <b>NOT</b> available in the Expert System</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Select the search information option (from the main menu)</li> <li>2. Type the query in the search box</li> <li>3. Click on the search button</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• The system should display error message indicates that there is no entry that matches query</li> <li>• The system should suggest some relevant keywords based on the query</li> </ul>

Table 3.7: TC\_Access Expert Information\_3

## Extension 2a Test Case (TC2)

Test Case ID	TC_Access Expert Information_4
Title	Print selected Expert Information Entry
Requirement	Testcase for Extension 2a of Access Expert Information
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"> <li>• The user should have be logged in to the system as nurse</li> <li>• Keyboard and mouse are working properly and connect to the system</li> <li>• The article which user wants to print is available in the Expert System</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Select Browse option</li> <li>2. Select Browse category</li> <li>3. Select an article from the available list</li> <li>4. Select to print the article</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• The system should display the Print Preview which allow user to select Printer and other options</li> <li>• The content of article should be printed correctly (content, color &amp; formatting)</li> </ul>

Table 3.8: TC\_Access Expert Information\_4

### 3.3 Notify Due Scheduled Events

#### 3.3.1 Fully Dressed Usecase



Figure 3.7: Notify Due Scheduled Events Fully Dressed

Use case ID	UC_Notify_Due_Scheduled_Events
Use case name	Notify Due Scheduled Events
Scope	System under Discussion (WhiteBox)
Level	User Level
Primary Actor	Machine (System Clock)
Stakeholders And interests	<ul style="list-style-type: none"><li>• Nurses want to be reminded on due scheduled events and warned if overdue by many ways such as Push Notification, Email or Text Message</li><li>• Supervisor needs to be notified if tasks or events that under her or his supervision overdue</li></ul>

Preconditions	<ul style="list-style-type: none"> <li>• Tasks such as dressing wound, reposition ... have been scheduled either manually or automatically into system (System under Discussion)</li> <li>• Time to get these tasks done is coming or passed but the system has not received any update on these events</li> </ul>
Post Conditions	<ul style="list-style-type: none"> <li>• Owner of scheduled event should receive reminder if scheduled event is going to start or due or over-due without update</li> <li>• The supervisor of events owner should receive reminder if the events are overdue without update</li> </ul>
Main Success Scenarios	<ol style="list-style-type: none"> <li>1. Machine Clock triggers the system to detect due scheduled events</li> <li>2. The system pushes Notification to owner mobile devices</li> <li>3. The system sends Notified Text Message to owner number</li> <li>4. The system sends Notified Email to owner email account</li> <li>5. Owner should be notified through Push Notification on Mobile Devices</li> <li>6. Owner should receive the Notified Text Message</li> <li>7. Owner should receive the Notified Email Message</li> </ol>

Extensions	<p>2a. Owner did not register any Mobile Device</p> <ol style="list-style-type: none"> <li>1. Go to next step</li> </ol> <p>2b. System received update on notifying event</p> <ol style="list-style-type: none"> <li>1. Stop the notifying procedure</li> </ol> <p>3a. Owner did not register any phone number</p> <ol style="list-style-type: none"> <li>1. Go to next step</li> </ol> <p>3b. System received update on notifying event</p> <ol style="list-style-type: none"> <li>1. Stop the notifying procedure</li> </ol> <p>4a. Owner did not register any email account</p> <ol style="list-style-type: none"> <li>1. Go to next step</li> </ol> <p>4b. System received update on notifying event</p> <ol style="list-style-type: none"> <li>1. Stop the notifying procedure</li> </ol> <p>4c. The schedule event is overdue</p> <ol style="list-style-type: none"> <li>1. Repeat this procedure but the target is his/her supervisor</li> </ol>
Special Requirements	There should be an interval between notification actions to give users chance to interact with the reminder in order to reduce user annoyance because of multiple notifications
Technology and data variations list	The notification message should contains event name, status such as Incoming, Due, Overdue; and its location
Frequency of occurrence	The frequency of occurrence should be configured by User. By default, it should occurred for each incoming, due and overdue event
Miscellaneous	If the system is to notify two events at the same time (in small interval of time), it should merge two notifications and notify once instead of twice

Table 3.9: UC\_Notify\_Due\_Scheduled\_Events

### 3.3.2 System Sequence Diagram

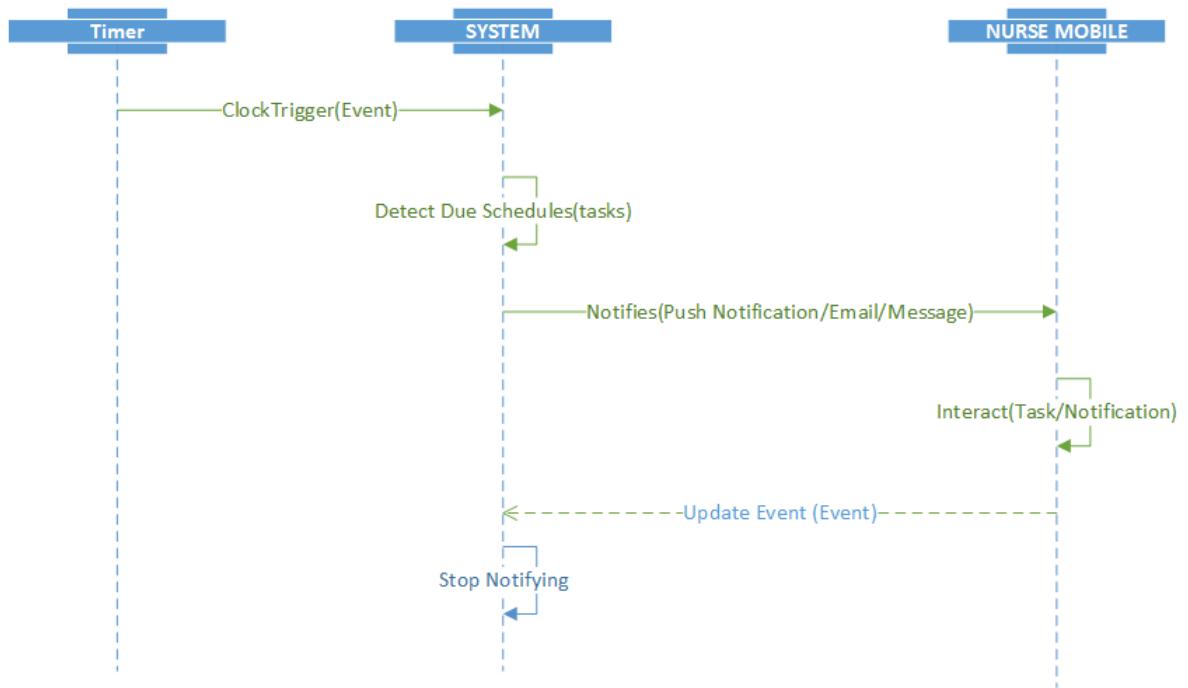


Figure 3.8: Notify Due Scheduled Events System Sequence Diagram

### 3.3.3 Activity Diagram

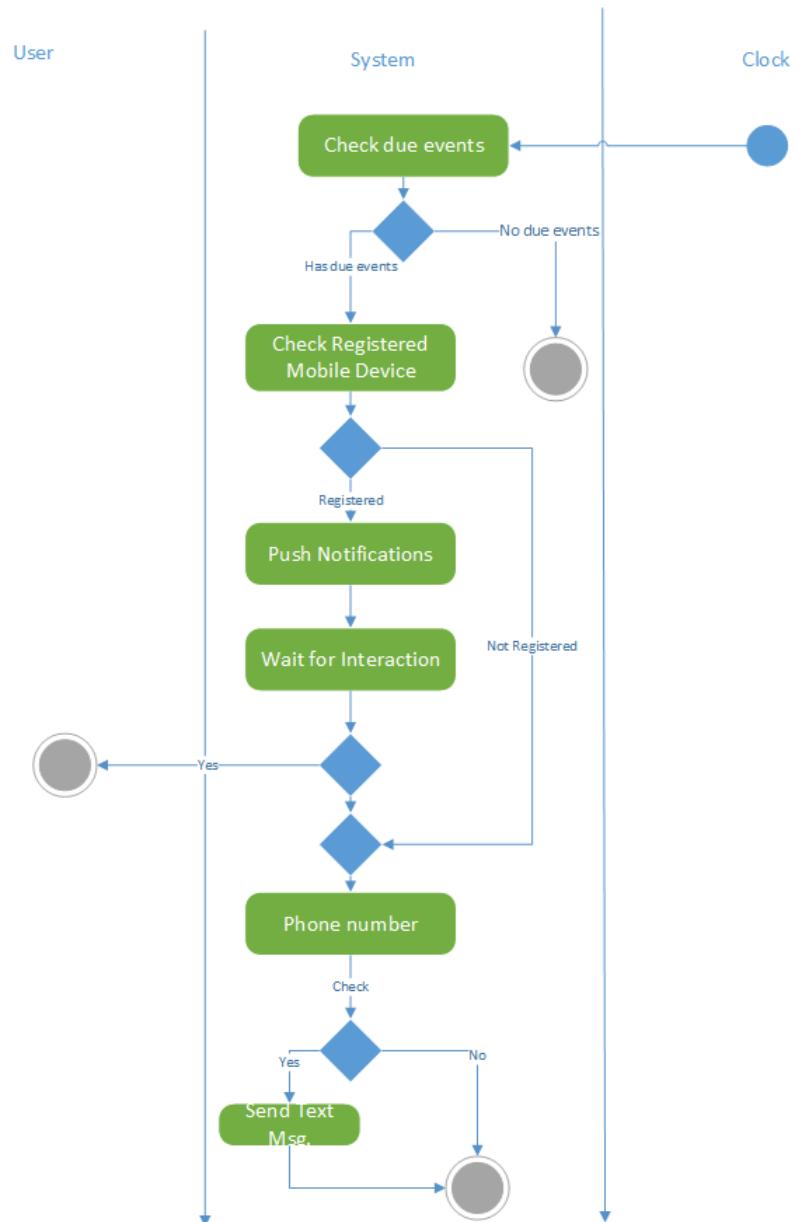


Figure 3.9: Notify Due Scheduled Events Activity Diagram

### 3.3.4 Testcases

#### Main Scenario Test Case

Test Case ID	TC_Notify_Due_Scheduled_Events_1
Title	Testcase for main scenario of Notify_Due_Events
Requirement	System notifies user on due schedule event and user takes no action while receiving these notifications
Type	Acceptance Test
Preconditions	<ul style="list-style-type: none"><li>• User registered email account, phone number and mobile device</li><li>• User setup (added) schedule into the system</li></ul>
Steps	<ol style="list-style-type: none"><li>1. Changes the clock of the system to due time of event or wait until the due time passed</li><li>2. Do not interact while receiving push notification, text message and email</li><li>3. Do not update the due schedule while receiving these notifications</li></ol>

Expected Results	<ul style="list-style-type: none"> <li>• User should receive the push notification on her/his mobile device with correct content <b>immediately</b> when the schedule is due</li> <li>• User should receive a text message on her/his phone with correct content</li> <li>• User should receive an email on her/his email account with correct content</li> <li>• The order should be push notification, text message and email</li> <li>• There are an interval between receiving these notification (the default value is 5 minutes)</li> <li>• The correct content of notification should contain task description, location and due state</li> </ul>
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Table 3.10: TC\_Notify\_Due\_Scheduled\_Events\_1

### Extension 2b Test Case

Test Case ID	TC_Notify_Due_Scheduled_Events_2
Title	Testcase for Notify_Due_Events Extension 2b
Requirement	System pushes notification and user updates on the due schedule event
Type	Acceptance Test
Settings	System network is working properly
Preconditions	<ul style="list-style-type: none"> <li>• User registered email account (phone number and mobile device)</li> <li>• User setup (added) schedule into the system</li> </ul>

Steps	<ol style="list-style-type: none"> <li>1. Changes the clock of the system to due time of event or wait until the due time passed</li> <li>2. Wait until receiving the push notification on the mobile device</li> <li>3. Updates on the due schedule event such as mark it completed within the allowed interval (default is 5 minutes)</li> </ol>
Expected Results	<ul style="list-style-type: none"> <li>• User should receive the push notification on her/his mobile device with correct content <b>immediately</b> when the schedule is due</li> <li>• User should NOT receive either text message or notified email</li> <li>• The correct content of notification should contain task description, location and due state</li> </ul>

Table 3.11: TC\_Notify\_Due\_Scheduled\_Events\_2

#### Extension 4c Testcase

Test Case ID	TC_Notify_Due_Scheduled_Events_3
Title	Testcase for Notify_Due_Events Extension 4c
Requirement	System can not notify user on overdue important event then notify her/his supervisor
Type	Acceptance Test

Preconditions	<ul style="list-style-type: none"> <li>● User did NOT register either email account, phone number or mobile device</li> <li>● The supervisor of the schedule's owner registered email account, phone number and mobile device</li> <li>● User setup (added) and important schedule into the system</li> </ul>
Steps	<ol style="list-style-type: none"> <li>1. Changes the clock of the system to due time of event or wait until the over due time of event passed</li> <li>2. User take no actions on the scheduled event until it's over due</li> <li>3. The supervisor of the owner takes no action while receiving the push notification, text message or email</li> </ol>

Expected Results	<ul style="list-style-type: none"> <li>● The supervisor should receive the push notification on her/his mobile device with correct content <b>immediately</b> when the schedule is overdue</li> <li>● The supervisor should receive a text message on her/his phone with correct content</li> <li>● The supervisor should receive an email on her/his email account with correct content</li> <li>● The notification order should be push notification, then text message and email</li> <li>● There are an interval between receiving these notification (the default value is 5 minutes)</li> <li>● The correct content of notification should contain task owner, task description, location and overdue state</li> </ul>
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Table 3.12: TC\_Notify\_Due\_Scheduled\_Events\_3

# Chapter 4

## Domain Modelling

The figure is on the next page

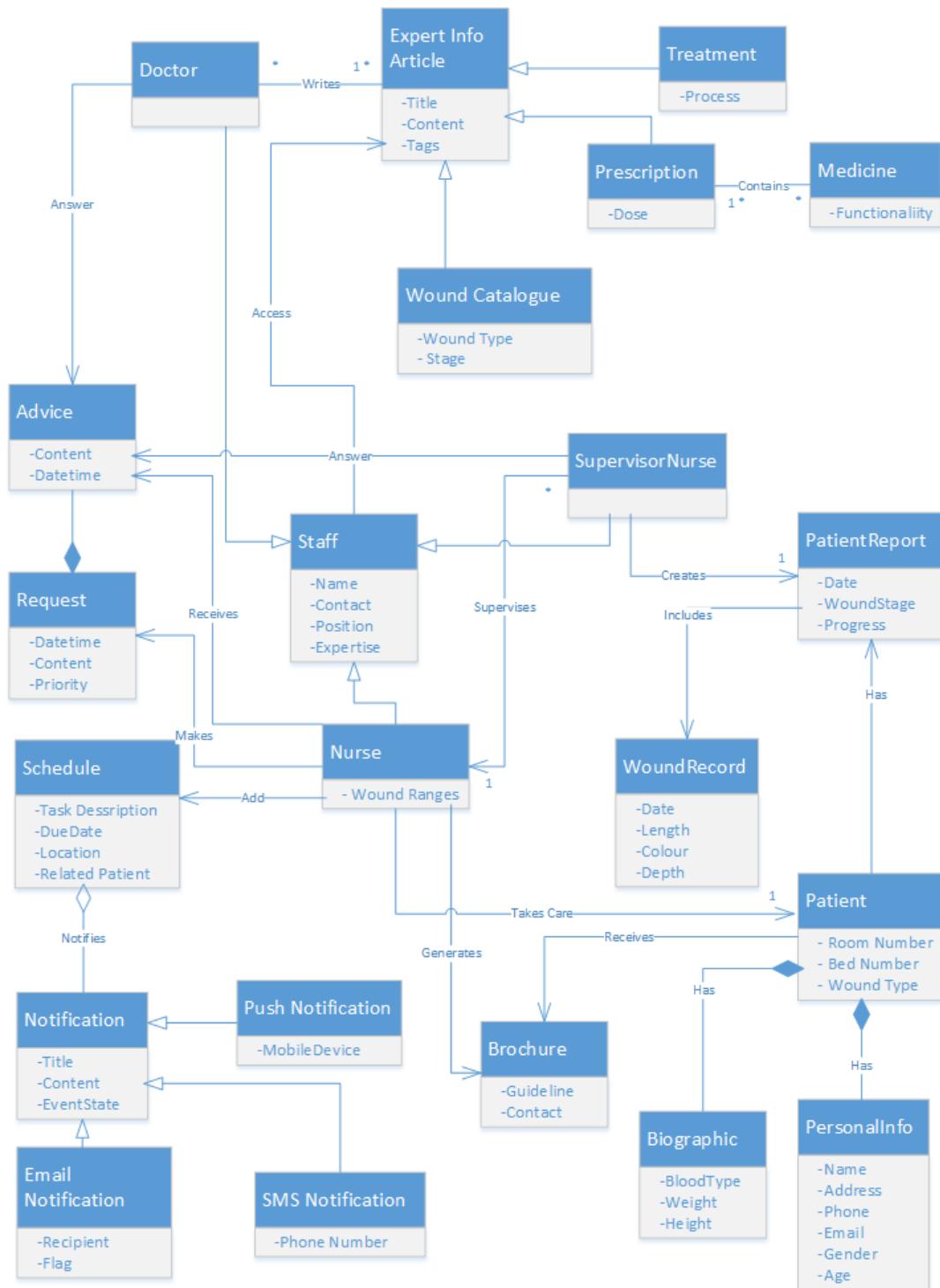


Figure 4.1: Conceptual Classes

# Chapter 5

## Traceability Matrices

### 5.1 User Needs versus Product Features

	F1	F2	F3	F4	F5	F6	F7	F8	F9	F10	F11	F12	F13	F14
N1	✓	✓												
N2			✓				✓							
N3				✓										
N4					✓									
N5						✓								
N6							✓					✓		
N7								✓	✓					
N8										✓	✓		✓	✓

Table 5.1: User Needs vs Product Features

#### User Needs:

- **N1:** Nurses should be able to enter wound information, doctor recommendation and patients preferences on Mobile Platform and Computer

- **N2:** Nurses should be able to determine the wound stage automatically according to the current data
- **N3:** Nurses should be able to print or generate the discharged brochure quickly without entering so much data
- **N4:** The system should be able to raise conflicts between doctors and supervisors if they have different advices
- **N5:** Doctors or supervisor should be able to see the progress charts of patient easily
- **N6:** Nurses should be able to access the expert information (such as wound category, prescription) that saved in the system
- **N7:** Nurse or Doctors or Supervisors should be able to retrieve the historical patient's records
- **N8:** Nurses should be able to set up schedule to check wound or change dressing and be reminded on the right time

#### **Features:**

- **F1:** The nurse should be able to enter wound information such as length, color, depth, blood into the system and these information will be stored. This action should be done on either Computer or Mobile platform
- **F2:** The nurses should be able to enter specific information of patients such as allergies, pregnant status, health status
- **F3:** The nurse (doctor or supervisor) should be able to retrieve the patient's wound stage according to the patient's current information
- **F4:** Nurses should be able to print or generate discharged brochure quickly without entering so much data
- **F5:** The system should be able to raise alert if there is conflict to all related people
- **F6:** Doctor or supervisor should be able to see the patient progress easily. Once clicked on "Progress Chart" button, the system will display a chart that reflects the progress of patient wound. item **F7:** Nurses, Doctors or Supervisors should be able to access the expert information such as wound category, prescription

- **F8:** Nurse or doctors or supervisors should be able to retrieve the historical patient's records
- **F9:** Doctors or supervisors should be able to print patients reports
- **F10:** The system should raise alert if there is any overlapped schedules
- **F11:** The system should notifies nurses at the right time of events
- **F12:** Nurses should be able to verify whether patient can use specific drug by entering it and got the result
- **F13:** Nurses should be able to add/remove/edit the schedule
- **F14:** If there is overdue about dressing or reposition of patients, the system should raise alarm to the nurse who is in charge, or her supervisors, and doctors

## 5.2 Product Features versus Use Cases

	UC1	UC2	UC3	UC4	UC5	UC6
F1	✓					
F2		✓				
F3				✓		
F4			✓			
F5				✓		
F6						✓
F7				✓		
F8						✓
F9						✓

Table 5.2: Product Features versus Use Cases

### Use Cases:

- **UC\_StoreWoundInfo(UC1):** Store Wound Info
- **UC\_EnterPatientInfo(UC2):** Enter Patient Information
- **UC\_PrintPatientBrochure(UC3):** Print Patient Brochure
- **UC\_RequestSupport(UC4):** Request Support
- **UC\_RaiseAlarm(UC5):** Raise Alarm
- **UC\_TracePatientRecord(UC6):** Trace Patient Record

### 5.3 Use Cases to Test Cases

Use Case ID	Scenario	Test Case ID
UC_StoreWoundInfo	1	TC_StoreWoundRecord_1
UC_StoreWoundInfo	2a	TC_StoreWoundRecord_2
UC_AccessExpertInfo	1	TC_AccessExpertInfo_1
UC_AccessExpertInfo	2a	TC_AccessExpertInfo_2
UC_AccessExpertInfo	4b	TC_AccessExpertInfo_3
UC_AccessExpertInfo	4b	TC_AccessExpertInfo_4
UC_NotifyDueScheduledEvents	1	TC_Notify_Due_Scheduled_Events_1
UC_NotifyDueScheduledEvents	2b	TC_Notify_Due_Scheduled_Events_2
UC_NotifyDueScheduledEvents	4c	TC_Notify_Due_Scheduled_Events_3

Table 5.3: Use Cases to Test Cases

## 5.4 Product Features versus Supplementary

	SUP1	SUP2	SUP3	SUP4	SUP5	SUP6
Create Expert Information	✓	✓	✓		✓	
Access Expert Information	✓			✓	✓	
Enter Wound Information	✓		✓		✓	
Enter Patient Information	✓				✓	
Generate Patient Brochure	✓		✓			
Notify Due events	✓	✓				✓

Table 5.4: Product Features versus Supplementary

### Supplementary List:

- **SUP1:** Functionality
- **SUP2:** Usability

- **SUP3:** Reliability
- **SUP4:** Performance
- **SUP5:** Interface
- **SUP6:** Supportability

# Chapter 6

## Supplementary

### 6.1 Purpose

This Document provides the detailed view of the Clinical Decision Support System (CDSS) which is mostly concerning the developers. It discusses various non-functional requirements of the system to which the developers have to comply. The Supplementary Document lists these requirements in an organized way to fully define the system TO-BE functionalities. It takes care of the aspects such as Supportability, Quality Assurance, Reliability, Usability, Performance as well as Design Constraints.

### 6.2 Scope

This Supplementary Specification applies to the Clinical Decision Support System (CDSS) developed for the ABC Hospital. The System under Discussions is supervised by Prof. Sutharsan Sivagnanam for the System Requirements Specification course. The CDS system should address the real world issues such as for nurse helping them with different wound procedures to alerting and reminding details about patients, conveniently storing patients record , for doctors operations like viewing patient recovering stats, guiding nurse (when needed). To fulfill the above requirement with better security, usability and reliability is within the scope of this document

### 6.3 Overview

The following Supplementary Specification will address the non-functional requirements of the system that addresses Performance, Quality Assurance,

Reliability, Usability as well as Supportability. Then, the document will address design constraints on the system being built. The Online User Documentation and Help System Requirements will be discussed followed by a list of the interfaces that must be supported by the application. Finally, we will address applicable standards applied on the system and the glossary.

## **6.4 Functionality**

Refer to the vision document

## **6.5 Usability**

The users of the system are hospital staff and the administrators who maintain the system. The hospital staffs are assumed to have basic knowledge of the computers. The administrators of the system to have more knowledge of the internals of the system and is able to rectify the small problems that may arise due to disk crashes, power failures and other catastrophes to maintain the system. The proper user interface, users manual, online help and the guide to use and maintain the system must be sufficient to educate the users on how to use the system without any problems.

## **6.6 Reliability**

The system is safety critical. If it moves out of normal operation mode, the requirement to drop to the next lower level and open it is given the priority. This emergency behavior shall not Software Requirement Specification occur without reason. The system has to be reliable due to the importance of data and the damages incorrect or incomplete data can do

### **6.6.1 Availability**

### **6.6.2 Mean Time Between Failures (MTBF)**

The system will be developed in such a way that it may fail once in a year.

### **6.6.3 Mean Time To Repair (MTTR)**

Even if the system fails, the system will be recovered from back up within an hour or less.

#### **6.6.4 Accuracy**

The accuracy of the system is limited by the accuracy of the speed at which the employees and users use the system.

#### **6.6.5 Maximum bugs or defects rate**

The maximum defect rate that the application could support is 3

#### **6.6.6 Bugs or defects rate**

A minor defect shall deviate the behavior of the system from what is expected while a critical defect shall cause the inability to use all the features of the system or leads to a system crash.

### **6.7 Performance**

The section outlines the performance characteristics of the Software system:

#### **6.7.1 Response Time for a Operation**

The system would be responsive enough. It should not take more than 30 seconds to search and display expert information. And should not take more than 5 seconds to store a patient information or a wound record

#### **6.7.2 Throughput**

The system should be able to handle 2000 requests at the same time (A request can be storing information, storing wound information, searching expert information or updating expert information)

#### **6.7.3 Capacity**

The system should be able to handle 2000 users simultaneously. Each user will be able to use multiple devices at the same time. Software Requirement Specification When working in normal mode, request by a user for a service should be handled immediately. Immediate feedback of the system's activities shall be communicated to the user by link page clicked. Even at peak time the CDSS system shall not experience any delay in the service response to the commands longer than 5 seconds. : The system is available 100% for the

user and is used 24 hrs. A day and 365 days a year. The system shall be operational 24 hours a day and 7 days a week

#### **6.7.4 Supportability**

This section indicates the set of requirements that will enhance the supportability or maintainability of the system being built.

#### **6.7.5 Auto upgrade to the new version**

When the mandatory upgrade version is available, the application should be able to force users to upgrade it from the centralized server

### **6.8 Design Constraints**

This section will indicate design constraints on the system being built.

#### **6.8.1 Software Languages**

The Software system shall support multiple French and English. In case of global recognition, the system shall detect the workstation culture and load the appropriate language resource library to display the corresponding strings to the user.

#### **6.8.2 Platform requirements**

The device deploying the Software system shall have at least 4 GB RAM in order to support the SQL Server and at least 2 hard disks with each disk has at least 160 GB to store and backup data

### **6.9 User Documentation and Help System Requirements**

The system provides embedded documentation in the application so that the end users can access this document from Help menu easily and instantly.

## **6.10 Purchased Components**

In order to enhance the performance of accessing and storing huge data of the hospital, the SQL Server 12 has been purchased. However, the license is for only one machine, thus the development team should not use this version but the SQL Server Express version (It is free from Microsoft)

## **6.11 Interfaces**

This section defines the interfaces that must be supported by the system.

### **6.11.1 User Interfaces**

The client application should be responsive and user friendly. Actually, the user interfaces should follow the user experience of the platform that it is running. For example, the client application on Windows should follow Windows User Experience but the client on iPad should follow iOS User Experience. However, the features and application flows should be unified between all platforms.

### **6.11.2 Hardware Interfaces**

The Local Area Network shall be used to communicate between application and the centralized database.

### **6.11.3 Software Interfaces**

The system shall use the OpenEHR to transfer or receive electronic health records from other hospitals

### **6.11.4 Communications Interfaces**

The system shall communicate with some special medical devices through bluetooth connection to retrieve patient body attributes such as heart rate, blood pressure

## **6.12 Licensing Requirements**

Only ABC Hospital employees with hospital permission are allowed to use the software. Any employees of the development company (such as developers,

testers and project manager) must sign the Agreement with the hospital before working on the project.

## **6.13 Legal, Copyright and Other Notices**

The system is an asset of ABC Hospital and shall be not installed, copied, distributed or modified without the Hospital permission. The source code and other resources such as graphic items, data testing fixtures also belong to the hospital only. They wont be used in any purpose without the Hospital permission.

## **6.14 Applicable Standards**

The system must be cleared (approved) by FDA and it must follow the EHR standard. Furthermore, any transmitting data between any devices must be encrypted by AES (Advanced Encryption Standard).

# Chapter 7

## Interviews

### 7.1 Interview with Registered Nurse

#### 7.1.1 User Profile

**Name:** Catherine Monda

**Company:** ABC Hospital

**Industry:** Health Care

**Job title:** Register Nurse

**Level:** One year of Experience

#### **Q. What are your key responsibilities?**

Key responsibility is to take care of the patients with different type of wounds such as pressure ulcers and Surgical Wounds at different stages

#### **Q. What outputs do you produce using the system?**

Make patients wound in good progress and be cured. Make patient feel happy and satisfied with hospital service

#### **Q. For whom is the system?**

- Patients who are have been treated or being treated at the hospital
- My supervisor Ms. Ann
- Hospital itself (e.g. Reputation)

**Q. How is success measured according to you?**

*The success is measured by:*

- Patients wounds progress
- Patients satisfaction
- And hospital reputation

**Q. What are the problems that interfere with your success?**

*Three main problems that prevent me with success:*

- Sometimes it is difficult to determine the stage of the wound
- Deal with difference of advises between the supervisor and the doctor
- Some redundant work such as entering repeated data

**Q. What trends make your job easier or difficult?**

The complaining of the patients makes the job more difficult

### 7.1.2 Assessing the problem

**Q. Why is assessing the stage of wound too hard?**

Assessing the wound stage is very difficult because it needs a lot of experience. Moreover, no mistake should be happened during this action

**Q. How do you solve it now?**

Firstly consulting a guide book from the hospital. And if it doesn't help then I go to get advice from the senior nurses or doctor

**Q. How do you like to solve this problem?**

It would be much better if I enter the length width or color of the wound, the Wound Catalogue provides the stage of the wound automatically

**Q. What else?**

Some patients that need special or extra treatments, but the doctors and my supervisor sometime give different advices. Then I have to deal these differences

**Q. How do you solve it now?**

I have been usually following my supervisor although I have trusted more on the doctor because she is in charge of me

**Q. How do you like to solve it?**

If the system can track or record the advice from either the doctor or supervisor. And it is much better if the system can detect conflict between them, then raise the issue to them; so I wont have to deal this difficulty

**Q. What else?**

Each time, the patient is discharged, the nurse must give him a brochure, but we must enter a lot of information to create a brochure. Actually, those information are being stored already in the system

**Q. How do you solve it now?**

We are using different Microsoft Word Templates, each for each kind of wound. But we still have to enter repeated

**Q. How do you like to solve it?**

If there is a software that can access patient records, then generate the user brochure automatically without entering data

### 7.1.3 Understanding the user environment

**Q. Who are using the current CDSS?**

In the hospital, all the nurses, doctor and supervisor are using the system

**Q. What is your healthcare background?**

Most of the wound care knowledge is obtained from the schools training and hospitals orientation sessions

**Q. What is the computer background of all the nurses in the hos-**

**pital?**

For young nurses like me We are quite familiar with computer but using computer or software is quite difficult for the older nurses

**Q. Are users experienced with this type of application?**

Yes, most of us are, but the familiarity depends on the computer background of each user and the length of time of using that application

**Q. Which platforms are in use?**

Mainly on Microsoft Windows 7

**Q. Are additional applications in use that are relevant to this application? If so, lets talk about them a bit?**

Right now, we are using a Wound Information Collector Application on the iPad for entering patient information but it is not integrated well with the system so we have to re-enter these data each day to the main system

#### **7.1.4 Recap for understanding**

*You have told me:*

1. You experienced difficulty in assessing or determining the wound stage
2. You refer the hospital guidebook to determine wound stage but sometime it is insufficient and wish that there is a system can give you advise on that
3. Sometime, doctor and supervisor give different advices and you have to deal with it
4. You hope that the system can detect the conflict and raise the issue to them so that you won't be in hard situation
5. You are entering information twice, once on the iPad application, then re-enter on the CDSS.
6. You have to enter boilerplate information when generating Patient Brochure

### 7.1.5 Assessing the opportunity

**Q. Who in your organization needs this application?** All the nurses, doctors and supervisors

**Q .How many of these types of users could use the application?** In my organization three kind of users. In fact, four kinds because accounts also are using the system

**Q. How do you value a successful solution?** Successful solution should be able to support us in entering information, accessing wound stage, providing knowledge about different wounds, and making decisions easily

### 7.1.6 Assessing the reliability performance and support needs

**Q. What are your expectations for reliability?**

In accessing the wound stage, it should provide us with correct and appropriate results. As I said before, any mistake can harm the patient and slow the progress

**Q. What are your expectations for performance?**

Time factor is very important while accessing the record, it should not take too long. Furthermore, search patient by name or listing patient at specific room should not take too long also

**Q. What are the security requirements?**

My Authentication should be protected. Other nurses should not be able to enter my patient information expect my supervisors. Furthermore, the system should log the author of records

### 7.1.7 Other requirements

**Q. Are there any legal, regulatory or environmental requirements or other standards that must be supported?**

I think, the software must be cleared by FDA before using. Furthermore because we have to transfer or record from other hospitals, the system must fulfil the specification of Electronic Heath Record

**Q. Can you think of any other requirements we should know about?**

No. That all I know till now

### 7.1.8 Wrap up

**Q. Are there any other questions I should be asking you?**

No, I dont have

**Q. If I need to ask follow up questions, may I give you a call?  
Would you be willing to participate in the requirements review?**

Yes. You can send me an email anytime

### 7.1.9 Analyst's summary

1. The system should be able to assess the wound stage based on patients records and progress
2. The system should be able to raise the conflict decision or advice between the supervisor or doctor
3. The system should be able to generate the patients brochure when they are being discharged with their records & states
4. The system should be able to integrate to Mobile Platform, especially iOS.

## 7.2 Interview with Doctor

### 7.2.1 User Profile

**Name:** Isabella Peirce  
**Company:** ABC  
**Industry:** Healthcare  
**Job title:** Doctor  
**Specialization:** All kinds of wound  
**Experience:** 7 years of experience

#### Q. What are your key responsibilities?

- Does initial assessment and recommends the course of treatment
- Monitors progress of patients who are being charged in by me or my team
- Supports the nurse if unable to identify the wound
- Approves the discharge of a patient
- Manages and assigns tasks to my team members

#### Q. For whom is the system?

- Patients with specific conditions
- Other healthcare professionals such as nurses
- Hospital values( e.g. Reputation)

#### Q. How is success measured?

- Safety for both patient and employees especially under my supervision
- Patient satisfaction
- Hospital culture
- Team work efficiency

- Cost effective for both hospital and patients

**Q. Which problem interferes with your success?**

- The cooperation between healthcare professional
- Inefficiency of the CDSS system

**Q. What if any trends make your job easier or difficult?**

Automation would make my job easier, especially in tracking and synthesizing the records.

### **7.2.2 Assessing the problem**

**Q. What is the major problem you face in the existing system?**

In order to monitor the progress of the patients, I have to review many patient records one by one. It is time consuming and probability of inaccuracy is higher

**Q. Why does this problem exist?**[1.2ex] The system simply does not support that

**Q. How do you solve it now?**[1.2ex] Writing down all the patient records on the time table, and keep checking the progress and variations in the records

**Q. How do you like to solve it?**[1.2ex] I would like to have a system where all the processes (e.g. nurses will enter updated information of the patient in the system) in the hospital are well integrated so I can just enter the patients name and I can get all of the patients information immediately, so that I can advice the nurses if there is any wrong on time

### **7.2.3 Understanding the user environment**

**Q. Who are the users?**

Doctors, nurses and receptionist

**Q. What is your computer background?**

I am familiar with MS office, Outlook and some basic computer soft wares

**Q. Are you experienced with this type of application?**

Yes. We use different systems which support various functions like entering the data and preparing the brochure

**Q. What are your plans for future problems?**

I need a single and well-integrated system which provides all the functionalities that are currently provided by different systems

**Q. Are additional applications in use those are relevant to this application? If so, lets talk about them a bit?**

No

**Q. What are your expectations for the usability of the product?** [1.2ex]  
It should be easy to understand and use, should provide a wound catalogue for the nurses

**Q. Do you require training to work on this software?** [1.2ex] Yes. I need the basic training to get familiar with this system

**Q. What are your expectations for training time?** [1.2ex] I dont require much training on this software but some documentation would be a good help.

#### 7.2.4 Recap for understanding

*You told me:*

- The current system is not well-integrated
- There is no knowledge base that assists you to monitor the patients progress

**Q. Does this adequately represent the problems you are having with your existing solutions?**

Yes. But I would also like to have a system which should warn or prompt the nurse for any recommendation or warning during patients treatment

### **7.2.5 Assessing the opportunity**

#### **Q. Who in your organization needs this application?**

We all will use it. However it would be more useful for nurses as they have to determine the wounds stage and need assistance while treatment

**Q. How do you value a successful solution?**[1.2ex] I should be able to fetch the progress chart of the patients accurately and it should not take that much time, its taking right now

### **7.2.6 Assessing the reliability performance and support needs**

Not Applicable

### **7.2.7 Other requirements**

Not Applicable

### **7.2.8 Wrap up**

Not Applicable

### **7.2.9 Analyst's summary**

- The system should support the knowledge base or be able to synthesize the patient records in order to provide the view of patients progress
- The system should support the nurse in determining the wound stage and assistance for treatment

# Chapter 8

## Glossary

Term	Definition
Assistant Nurse	The intermediate experienced nurse with from five to ten years of experience. Main responsibility is to taking care of Pressure Ulcer at different levels
Bed-ridden	Confined to bed due to illness
Braden scale	A tool is for Predicting Pressure Sore Risk. It consists of six categories: sensory perception
CDSS	Clinical Decision Support Systems
Patient's brochure	A comprehensive guide describing the patient's wound, its characteristics, how it is supposed to be taken care of, what kind of symptoms need to be disclosed with a specialist in case they're observed (e.g. redness, swelling, infection, etc.), dietary advices, etc
Patient's record	All the details of a patient including all patient information, wound details, wound recovery progress report, reason for hospitalization, possible allergies, preferences, etc

Pressure Ulcer	A Pressure ulcer is damage that occurs on the skin and underlying tissue
Registered Nurse	The minimum of experience. They usually have less than five years of experience. Works under supervision of Wound Nurse; And if any difficult situation is not handled by herself, she can get advice from her supervisor
Wound Nurse	The most experienced nurse with more than ten years of experience. Besides taking care the most difficult stage of wound, they mentor some registered nurses
Stage I pressure ulcer(Non-blanchable erythema)	Intact skin with non-blanchable redness of a localized area usually over a bony prominence [1]
Stage II pressure ulcer (Partial thickness)	Partial thickness loss of dermis presenting as a shallow open ulcer with a red pink wound bed, without slough [1]
Stage III pressure ulcer(Full thickness skin loss)	Full thickness tissue loss. Subcutaneous fat may be visible but bone, tendon or muscle are not exposed [1]
Stage IV pressure ulcer(Full thickness tissue loss)	Full thickness tissue loss with exposed bone, tendon or muscle. Slough or eschar may be present [1]
Surgical wound	A surgical wound is a cut or an incision in the skin that is usually made by a scalpel during surgery. A surgical wound can also be the result of a drain placed during surgery [2]
Wound catalogue	A comprehensive reference of wound types including illustrations of each wound type
Medical Brochures	The type of medicines required to cure a particular wound is being printed on the paper by the responsible Doctor or wound nurse

Treatment Plans	Treatment given to a patient solely depends on the progress of the wound being cured. Therefore treatment plans helps doctors to maintain a record about which patient list of medicines and schedule which were effective for treatment
EHR Format	EHR stands for electronic health record which is a kind of standard that can help medical institutions to maintain uniformity in accessing patient information across several Hospitals
Patient Allergies	Allergy is a kind of a negative reaction that occurs because of unsuitability to a particular medication

# References

- [1] <http://www.npuap.org/resources/educational-and-clinical-resources/npuap-pressure-ulcer-stagescategories/>
- [2] <http://www.healthline.com/health/surgical-wound>
- [3] Yun-Ke Chang, Christopher Khoo, and Armineh Nourbakhsh *Requirement Analysis for a Nursing Decision Support System*